The present study conducted as a part of the doctoral research leading to a degree of *Doctor of Philosophy* (Ph.D.) in Management of Veer Narmad South Gujarat University, Surat, aims on *A study of supply chain management practices in select engineering units of Gujarat*. The study has been conducted during May 2010 to October 2012. The outcome of the research has been presented in the thesis as per the following chapterisation scheme.

Chapterisation Scheme

Chapter No.	Topics
1.	Introduction to Supply Chain Management
2.	Review of Literature
3.	Research Methodology
4.	Data Analysis and Findings
5.	Conclusion and Recommendation
	Bibliography

Chapter-1 Overview of Supply Chain Management

An overview has been presented in the Chapter-1 of the thesis. A glimpse of the chapter is presented below:

History of the supply chain initiative

The history of the supply chain initiative can be traced to early beginnings in the textile industry with the quick response program and later to efficient consumer response in the grocery industry. More recently a variety of companies across many industries have begun looking at the entire supply chain process. This section will discuss those early beginnings of the supply chain and some more recent success stories.

Different views on SCM/Philosophies of SCM/Modeling Approach/Components of SCM

Introduction to supply chain concepts

Firms can no longer effectively compete in isolation of their suppliers and other entities in the supply chain. Interest in the concept of supply chain management has steadily increased since the 1980s when companies saw the benefits of collaborative relationships within and beyond their own organization.

Interest in supply chains

Why has managing the supply chain become an issue for the 1990s? In part, the answer lies in the fact that few companies continue to be vertically integrated. Companies have become

more specialized and search for suppliers who can provide low cost, quality materials rather than own their source of supply. It becomes critical for companies to manage the entire network of supply to optimize overall performance. These organizations have realized that whenever a company deals with another company that performs the next phase of the supply chain, both stand to benefit from the other's success.

A second reason partially stems from increased national and international competition.

A third reason for the shift in emphasis to the supply chain is due to a realization by most companies that maximizing performance of one department or function may lead to less than optimal performance for the whole company.

Collaborative supply chain initiatives

Recently, several industry collaborative groups have developed to research aspects of supply chain management. The findings of these groups should provide practitioners with guidelines for "best practices" in supply chain design and accelerate the implementations of these practices. The Council was formed to establish a framework to enable manufacturers and their suppliers to build a stronger supply chain and reap the benefits of improved supply chain management.

Linking the supply chain to the business strategy

Supply chain capability is as important to a company's overall strategy as overall product strategy. Supply chain management encourages management of processes across departments. By linking supply chain objectives to company strategy, decisions can be made between competing demands on the supply chain. Improvements in performance are driven by externally-based targets rather than by internal department objectives.

Companies must evaluate the effectiveness of the supply chain strategy using a new set of measures. Typical rewards aimed at improving performance of functions or departments must be revised to strive to improve supply chain performance overall. By trying the supply chain strategy to the overall company strategy, the objectives become process objectives rather than functional objectives.

Activities / Functions

Supply chain management is a cross-function approach to manage the movement of raw materials into an organization, certain aspects of the internal processing of materials into finished goods, and then the movement of finished goods out of the organization toward the end-consumer. These functions are increasingly being outsourced to other entities that can perform the activities as per following for better or more cost effectively:

1) Strategic

2) Tactical

3) Operational

Supply Chain Business Process Integration

Supply chain business process integration involves collaborative work between buyers and suppliers, joint product development, common systems and shared information. According to Lambert and Cooper [2000] operating an integrated supply chain requires a continuous information flow. The key supply chain processes stated by Lambert [2004] are:

- Customer relationship management
- Customer service management
- Demand management
- Order fulfillment
- Manufacturing flow management

Best in Class companies have similar characteristics. They include the following:

a) Internal and external collaboration

b) Lead time reduction initiatives

c) Tighter feedback from customers and market demand

d) Customer level forecasting

Supply Chain Modeling Approaches

The strategic decisions are, for the most part, global or "all encompassing" in that they try to integrate various aspects of the supply chain. Consequently, the models is that describe these decisions are huge, and require a considerable amount of data. Often due to the enormity of data requirements, and the broad scope of decisions, these models provide approximate solutions to the decisions they describe. The operational decisions, meanwhile, address the day to day operation of the supply chain. Therefore the models that describe them are often very specific in nature. Due to their narrow perspective, these models often consider great detail and provide very good, if not optimal, solutions to the operational decisions.

Stages / Components of SC

The basic stages / components in a supply chain can be classified as:

a) Supplier's / Vendors / Sub-Contractors

b) Processing plants / facilities

c) Distribution / sale channels of finished products to customers.

However, the chain becomes very large and complex in larger organizations due to the large

number of suppliers from whom raw materials / components and other services are procured, located at different places geographically as well as processing factories which may at more than one location and finally the warehouses, wholesalers and retailers spread over large regions to reach customers. All the external organizations involved in this supply chain are considered as "SC PARTNERS" who have a share in the profits and risks of the total chain performance. This creates a deep sense of participation, overcoming individual objectives of each partner.

The Major Objectives of SCM are

a) To reduce the overall cost of the finished product sold to the customer

b) To reduce the overall delivery time – from customer order to delivery of goods

c) To minimize losses at every stage of the supply chain

d) To achieve higher customer satisfaction through quality, variety, cost and time.

Why SCM is so vital for Organization Today?

Some of the major reasons for popularity of SCM practice are

a) Competition and saturation of markets in developed countries need for new markets.

b) Globalization practices being politically accepted by most of the nations.

c) Higher expectations and affordability of products by customers

d) Growth of transportation and manufacturing facilities within and across countries.

e) Shortened Product-life cycles and faster introduction of new products.

Outsourcing widely to focus on Core-Competencies

It is realized that organizations whether within a country or multinational companies (Global) have to continuously grow to remain competitive and sustain profitability. They need to build extensive suppliers, service providers and distribution facilities to make wider variety; cheaper products needed for customers and deliver them fast. Constant efforts to reduce product cost and provide better return to customers involve close coordination among all the partners in the supply chain. To reduce costs and increase focus on Core-competency, many large organizations today, outsource most of the non-core activities, which once they were doing themselves earlier. Generally product design, special manufacturing techniques and marketing strategies come under core-competency. So, SCM is needed to coordinate all other functions, outsourced to external partners. The capability to develop strategic partnerships which work smoothly, differentiate the leaders from others, in the large global Multinational organizations now.

Example

Up to 1990's, General Motors of USA was the top automobile manufacturer in the World with the highest sales, profits and growth for over 50 years. However, by adapting SCM practices more successfully Toyota of Japan could overtake General Motors to become the largest automobile maker in the world now, even though Toyota started its production only 30 years back. Toyota today is considered as the model for the best SCM practices in the world. It treats its supplies and sub-contractors with such respect and concern for their growth that even USA auto ancillary units are keen to work for Toyota instead of General Motors and Ford!

In India the car-maker MARUTI has retained its top position in the country by adapting SCM practices. It is able to reduce material costs considerably by developing competent ancillary suppliers, who make, store and supply the parts with the lead time of only few hours for final assembly at MARUTI factory. The ancillary suppliers are widely spread over other States like Tamilnadu, Maharashtra, Punjab and Gujarat. Automatic ordering, payments and control is done through advanced I.T. systems on-line in real-time. These 'Lean manufacturing' practices have made MARUTI highly competitive among the car-producers.

Many small and medium scale industrial units in India are able to now become partners and supply components/services to large Indian Firms and MNC's like Ford, G.M, Phillips, P&G, Wal-Mart, and Merck etc.

Logistics

"Logistics" is a word originally associated with major wars. It means planning and soldiers, armored vehicles, artillery and ammunition to the battlefield as per the strategies of the generals. It involves also all supporting activities like food and suppliers, medicines, bringing back injured personnel, maintenance of vehicles, equipment and many other tasks for the soldiers at difficult locations. It also involves coordination with fighter aircrafts, communication (signals), and engineering for roads / bridges in the forward areas.

Due to the development in supply chain management, logistics has become a focal point for organizations today in both manufacturing and services organization employ special "Logistics Managers"

Broadly, the common functions in "Logistics: today are:

a) Inbound Logistics

b) Processing Logistics

c) Outgoing Logistics

Logistics is a function which gained importance in the modern Supply Chain Management. It helps the organization to effectively handle procurement of incoming materials and delivery of final products to the customers in an integrated and planned way.

Organization today cannot achieve success and market leadership unless they create and manage efficient, responsive and profitable supply chains.

TQM in supply chain management

The primary focus of total quality management (TQM) is customer satisfaction. Continuous improvement with cost reduction, worker empowerment with measurement of results of high quality goods and services are primary vehicles for achieving customer satisfaction. Effective TQM hinges also on management performance in planning, organizing, influencing and controlling activities in all functional areas with proper teamwork (such as marketing, purchasing, design, and engineering, production, distribution, finance and accounting, human resources etc.).

Sound SCM strategies focus on developing strategic alliances based on core competencies. In the new economy, companies operate in a physically distributed manufacturing or service environment. To integrate the activities of partnering firms along the value chain, various information technologies and systems such as ERP have been used. A fundamental challenge in applying TQM in supply links up and down the value chain as required in SCM, in the development of programs and techniques that encourage that culturally diverse workforces to continuously improve all areas of organizational performance. TQM can enhance communications along the supply chain through enhancement of quality in ERP, partnership development, and CRM [Madu and Madu, 2003].

TQM methods and approaches could be used to eliminate those inefficiencies, thereby improving the overall effectiveness of a supply chain. Process-based, value-based, and activity based cost management approaches may be suitable for TQM in SCM [Locamy and Smith, 2000] intangible assets comprise the majority of a firm's market value and the majority of intangible assets constitute the value contents within relationships; relationships with customers, employees, partners and suppliers. In ordered to achieve success in the relationship age and achieve sustainable market value, firms will need to develop a balanced approach in goal setting, quality programs and management techniques to grow and maximize their most important capital store, relationship assets [Galbreath, 2002].

The six major dimensions of SCM are:

a) Partnership

b) Information technology

c) Operational flexibility

d) Performance measurement

e) Management commitment

f) Demand characterization [Lee and Kincade, 2003]

In the continually changing the global market, quality products along are no longer enough. New challengers now include a focus on supply to determine the right time and place for product delivery [Chin et al., 2004; Robinson and Malhotra, 2005]. Although TQM and SCM share the same ultimate goal, which is customer satisfaction, their primary goals are different, as implied by the emphases on "quality and supply". Better quality and a faster delivery always lead to lower costs.

Chapter-2 Review of Literature

A detailed literature review has been carried out in order to identify the research gap. A brief of the review has been presented below:

Definition

A supply chain is a is a network of facilities and distribution options that performs the function of procurement of materials, transformation of these materials into intermediate and finished products, and the distribution of these finished products to customers. Supply chains exist in both service and manufacturing organization, although the complexity of the chain may vary greatly from industry to industry and firm to firm.

SCM is the management of a network of interconnected businesses involved in the ultimate provision of product and service packages required by end customers [Harland, 1996]. Supply Chain Management spans all movement and storage of raw materials, work-in-progress inventory, and finished goods from point of origin to point of consumption.

Supply chain is a network of suppliers of raw materials, processing facilities and distribution channels to deliver the furnished product to customers.

Examples of SCM

Below is an example of very simple supply chain for a single product, where raw material is produced from vendors, transformed into finished goods in a single step, and then transported to distribution centers, and ultimately, customers. Realistic supply chains have multiple end products with shared components, facilities and capacities. The flow of material is not always

along an arborescent network, various modes of transportation may be considered, and the bill of materials for the end items may be both deep and large.

For example

a) In the Cement Industry, the manufacturer procures various items like lime stone, gypsum, fuel, packing materials etc. from different suppliers. Cement is manufactured in the factory using machinery. It is packed into bags and shifted to central ware houses. Depending on customers order, cement is distributed by transporting it through regional ware houses, whole sellers and retailers to the final customer.

b) The world famous sports shoe maker "NIKE" of USA mainly designs and plans marketing at their Head quarters in USA, but has material suppliers as well as manufacturing plants across the world – in South Korea, Taiwan, China and a few European Countries. The products are sold in most of the countries in the world. "NIKE" requires SCM to plan their purchasing, production and distribution functions with high integration of all partners across the globe to sell their competitive products for changing customer demands.

c) Indian car maker 'MARUTI' has an extensive network of raw material and parts suppliers, transporters, Factories, distribution channels, agents and service providers/maintenance units for their customers. All these are connected through special I.T. systems to provide information and integrate the activities to avoid bottlenecks, excess inventory etc.

Role of SCM

Traditionally, marketing, distribution, planning, manufacturing, and the purchasing organizations along the supply chain operated independently. These organizations have their own objectives and these are often conflicting. Many manufacturing operations are designed to maximize throughput and lower costs with little consideration for the impact on inventory levels and distribution capabilities. Purchasing contracts are often negotiated with very little information beyond historical buying patterns. The result of these factors is that there is not a single, integrated plan for the organization there were as many plans as businesses. Clearly, there is a need for a mechanism through which this different function can be integrated together. Supply chain management is a strategy through which such integration can be achieved. **Cooper and Ellarm [1993]** compare supply chain management to a well-balance and well-practiced relay team.

There are four major decision areas in supply chain management:

1) Location
2) Production

3) Inventory
4) Transportation (Distribution)

And there are both strategic and operational elements in each of these decision areas.

1) Location Decision: The geographic placement of production facilities, stocking points, and sourcing points is the natural first step in creating a supply chain. The location of facilities involves a commitment of resources to a long-term plan. Once the size, number, and location of these are determined, so are the possible paths by which the product flows through to the final customer. These decisions are of great significance to a firm since they represent the basic strategy for accessing customer markets, and will have a considerable impact on revenue, cost, and level of service. These decisions should be determined by an optimization routine that considers production costs, taxes, duties and duty drawback, tariffs, local content, distribution costs, production limitations, etc. (Arntzen, Brown, Harrison and Trafton [1995]). Although location decisions are primarily strategic, they also have implications on an operational level.

2) Production Decision: The strategic decisions include what products to produce them in, allocation of suppliers to plans, plans to DC's, and DC's to customer markets. As before, these decisions have a big impact on the revenues, costs and customer service levels of the firm. These decisions assume the existence of the facilities, but determine the exact path(s) through which a product flows to and from these facilities. Another critical issue is the capacity of the manufacturing and this largely depends on the degree of vertical integration within the firm. Operational decisions focus on detailed production scheduling. These decisions include the construction of the master production schedules, scheduling production on machines, and equipment maintenance. Other considerations include workload balancing, and quality control measures at a production facility.

3) Inventory Decisions: These refer to means by which inventories are managed. Inventories exist at every stage of the supply chain as either raw material, semi-finished or finished goods. They can also be in-process between locations. Their primary purpose to buffer against any uncertainty that might exist in the supply chain. Since holding of inventories can cost anywhere between 20% to 40% of their value, their efficient management is critical in supply chain operations. It is strategic in the sense that top management sets goals. However most researchers have approached the management of inventory from an operational perspective. These include development strategies (push versus pull), control policies the determination of the optimal levels of order quantities and reorder points, and setting safety

stock levels, at each stocking location. These levels are critical, since they are primary determinants of customer service levels.

4) Transportation Decisions: The mode choice aspects of these decisions are the more strategic ones. These closely linked to the inventory decisions, since the best choice of mode is often found by trading-off the cost of using the particular mode of transport with the indirect cost of inventory associated with that mode. While air shipments may be fast, reliable, and warrant lesser safety stocks, they are expensive. Meanwhile shipping by sea or rail may be much cheaper, but they necessitate holding relatively large amounts of inventory to buffer against the inherent uncertainty associated with them. There for customer service levels and geographic location play vital roles in such decisions. Since transportation is more than 30% of the logistics costs, operating efficiently makes good economic sense. Shipment sizes (consolidated bulk shipments versus Lot-for-Lot), routing and scheduling of equipment are key in effective management of the firm's transport strategy.

Evolution & Development of Supply Chain Management

The major phases through which the present SCM evolved are

a) Before 1960's: M.R.P.I

Managements of manufacturing of organization realized that out of the total cost of a product, approximately 60% to 70% is materials cost. Any reduction in materials cost directly contributed to the profitability. Materials Requirement Planning (MRPI) to precisely plan purchase and storing of input materials based on sales forecast / orders position, controlling inventory to the minimum possible levels in tune with the production schedule has been widely adapted. Many organizations, including in India, could achieve great reduction in inventory levels, reducing liquidity and other financial problems, increasing profitability. Materials managers have become key-members of top management team.

b) 1960's to 1980's: M.R.P. I II and E.R.P.

With increasing competition and rising customer demands, controlling purely material procurement and storing cost were not sufficient to reduce product cost. Manufacturing Resource Planning (MRPII) identified additionally precise requirement of materials and process-stock at every stage of manufacture in direct relation to the customer-orders combining purchasing and manufacturing effectively. Enterprise Resource Planning (ERP) based on advances in information technology has provided a dynamic online system to guide the managers for the integration suppliers, purchasing, manufacturing and marketing across the entire organization (enterprise). It could coordinate and provide decision-support to

optimize all functions including Finance and Human Resources (Employees) to achieve overall efficiency cost reduction and better service to customers. Software vendors like SAP, ORACLE, BAAN have contributed to improve the performance of large organization with high product variety and dispersed / complicated multi-level activities.

c) Post – 1980's: SCM

ERP is able to provide decision support system to managers integrating the activities within the organization / enterprise. Due to the increasing levels of business activities, many agencies / supporters are involved in it from outside the organization. Suppliers / vendors of raw materials, components, transporters, and retailers etc who are not members of the organization have critical role in fulfilling the customer's needs. Thus, need is felt to have a system, which comprises of both members within and outside the organization to work together and collaborate to provide best overall performance. Every organization or firm that contributes to the main enterprise is given the status of "Partners", who will share the risk as well as prosperity/profit/growth with the main enterprises. The external agencies are not treated as mere "Suppliers" or "Sub-Contractors" but business-partners, with clearly defined projects sharing practices. Thus, any order or changes in the Customer's requirement is conveyed in "real time", "on-line" to all the partners involved so that they all know their role/action to be taken and work in collaboration, even though they may have conflicting business interest. This concept is termed "Supply Chain Management" which has gained immense popularity across the world.

Developments in Supply Chain Management

Six major movements can be observed in the evolution of supply chain management studies:

1) Creation Era: The term supply chain management was first coined by an American industry consultant in the early 1980s. However the concept of supply chain in management, was of great importance long before in the early 20^{th} century, especially by the creation of the assembly line.

2) Integration Era: This era of supply chain management studies was highlighted with the development of Electronic Data Interchange (EDI) systems in the 1960s and developed through the 1990s by the introduction of Enterprise Resource Planning (ERP) systems.

3) Globalization Era: The third movement of supply chain management development, globalization era, can be characterized by the attention towards global systems of supplier relations and the expansion of supply chain over national boundaries and into other continents.

4) Specialization Era-Phase One-Outsourced Manufacturing and Distribution: In the 1990s industries began to focus on "core competencies" and adopted a specialization model. Companies abandoned vertical integration, sold off non-core operations, and outsourced those functions to other companies. This changed management requirements by extending the supply chain well beyond the four walls and distributing management across specialized supply chain partnerships.

5) Specialization Era-Phase Two-Supply Chain Management as a Service: Specialization within the supply chain began in the 1980s with the inception of transportation brokerages, ware house management, and non asset based carriers and has matured beyond transportation and logistics into aspects of supply planning, collaboration, execution and performance management.

SCM in India

Today's businesses have become extremely complex. The interplay of the three Cs, namely, consumers, competition and convergence, has thrown open new challenges for organizations all over the world. Consumers have become highly discerning in their choice of products and services. The pressure of competition has accelerated product changes, supercharged by shortening product and technology development lifecycles. Convergence has shifted the balance of power in favor of the consumers thereby giving way to globalization of businesses and integration of economies. Although this may have thrown open a plethora of opportunities for all – in the form of variety and choice, it has at the same time added the highest degree of uncertainty and unpredictability to business processes. To combat these risks and challenges, organizations round the globe are re-organizing and streamlining their supply chains.

Worldwide interest in supply chain management has increased steadily since the 1980s when organizations began to see the benefits of collaborative relationships. This management concept is, however, nascent in India. Increasing uncertainty of supply networks, globalization of businesses, proliferation of product variety and shortening of product life cycles have forced Indian organizations to look beyond their four walls for collaboration with supply chain partners. Changes in the environment have been so dramatic and sudden that Indian organizations have realized the inappropriateness of competing effectively in isolation from their suppliers and other associates of supply chain. Rather, the need for adopting collaborative methodologies, at this stage, is more than ever before because of the recent economic deregulation and globalization of the Indian industry. The traditional "protective"

economic, industrial and organizational boundaries have been demolished. While emerging markets offer opportunities they also bring along new rivals. Information networks and technological convergence are re-defining the rules of economic and trading relationships within the country. Hence, it has become necessary for Indian organizations to look for methodologies and processes that produce maximum efficiency both within and beyond their operations. For most Indian organizations, which have hardly ever operated in an "open" economy, working along with the right business partners (suppliers, customers and service providers), fostering trust between them and designing the right system of gauging performance is altogether a new ball-game. Although India, with a population base of over a billion, is one of the fastest developing economies of the world, it needs a different approach to put its economy on the path of sustainable economic growth. India's economic and infrastructure scenario Before the 1990s, Indian organizations operated in a protected environment. There was very little competition even amongst domestic players. Business was driven by almost monopolistic strategies. However the de-regulation of the Indian economy in the last decade has attracted global players in every industrial sector and has unleashed a new competitive spirit in the Indian organizations**.** Statistics reveal that India, the fifth largest country in terms of gross national product (GNP) and purchasing power parity (PPP) and a consumer base of over a billion (CMIE, 2000), constitutes one of the fastest growing markets in the world. India is also counted among the richest with regard to cheap skilled labor, scientific and technological resources and entrepreneurial talents. However, India lags behind in competitiveness because of various factors. These include continued reliance on licensing rules, price controls, and state ownership of crucial undertakings, currency controls, barriers to trade along with political instability and a high level of corruption. The Indian infrastructure – comprising roads, railways, airports, seaports, information technology (IT), telecommunications and energy production – is considered very poor as compared with other developed and developing countries. The overall Indian infrastructure is rated 54th among 59 countries in comparison to other developing countries:

Roads: By the end of 1996-1997, India had a total of 24.66 lakh km of road length network. According to estimates of the Planning Commission, the roads carried just 11 percent of goods and 28 percent of passengers during 1950-1951. The proportions stood at 60 percent for goods and 80 percent for passengers during 1995. Express and national highways constitute only 1.4 percent of the total road length, but carry nearly 40 percent of total road traffic. Reach in the interiors of the mainland is limited with only 48 percent of the 0.55

million villages being connected with roads. This poses a serious limitation of access and connectivity to rural markets. In spite of the vast road transport network, India is rated 56th in terms of the competitiveness on road infrastructure. This is primarily because the quality of roads plays a pivotal role towards safe and swift transportation of goods and Indian roads are of poor quality.

Rail transport: The Indian railway network is the second largest railroad system in the world covering a route length of 81,511km. This facilitates 4,630.05 million passengers and 450 million tons of freight movement every year. However, in terms of the quality of rail infrastructure, Indian railways are rated 25th among 59 nations (World Economic Forum, 2000). This results in the slow average speed of freight movement and low average wagon turnaround time, which are major concerns for the logisticians in the country.

Airports: The six international and 87 domestic airports handle 0.22 million metric tones of domestic cargo and 0.468 million metric tones of international cargo, which is extremely poor in terms of world standards. As a result, the quality of airport infrastructure is rated 40th among 59 countries (Porter, 2000). This poses a serious limitation in procurement, especially when companies are looking at adopting global sourcing strategies to reduce costs and enhance product quality.

Seaports: There are 11 major ports that handle the total foreign trade of the country amounting to 271.92 million tons. The facility and infrastructure of Indian ports are rated 51st among 59 countries primarily on account of lack of storage space and outdated handling equipment.

Telecommunications: With a teledensity (number of phone lines per 100 persons of the population) of 3.6 in March 2001, the telecommunication network in India is one of the largest telecommunications networks in Asia. This capacity has increased to 4.89 with the availability of cellular and WLL operators. However, it drastically lags the global average of 17.2. Developing countries like Brazil and China have a teledensity of 21.8 and 13.8 respectively. Developed countries like USA and UK have teledensity of 66.5 and 58.8 respectively. As a result, delivering low-cost voice telephony and low-cost high-speed computer networking for communication and business integration remains a big challenge in the Indian scenario.

IT: The 43 Internet service providers provide Internet access to 5 million users in the country. In 2001, the IT expenditure of 3.46 percent of GDP resulted in a computer density (PCs per 1,000 persons of the population) of 1.5 – making the reach and availability of IT

services far from desirable. A major part of this is due to the non-availability of wide area networks in the public domain as well as lack of awareness by the users.

All the factors related to infrastructure stated above have adversely affected the supply chain network in the country – both in terms of lead-time and costs. Indian organizations were ill-prepared for meeting the challenges affected by an open economy and had not developed the required infrastructure to meet the eventuality created by globalization of businesses and deregulation of the Indian economy. The challenge in such a scenario is to come out of the comfort zone provided by a "protected" economy, redesign and implement bold policies with emphasis on effective mobilization of resources, achieve sustained export growth, and eventually develop competitive strategies to have a sustained GDP growth rate of over 7 percent.

Some Issues and Challenges

Supply chain management must address the following problems:

1) Distribution Network Configuration

2) Distribution Strategy

Above all activities must be coordinated well together in order to achieve the least total logistics cost. Trade-offs exist that increase the total cost if only one of the activities is optimized.

SCM in Developed Countries

SCM Practice and Performance in New Zealand

Supply chain management (SCM) is a new concept involving the integration of all the value-creating elements in the supply, manufacturing, and distribution processes: from raw material extraction, through the transformation process, to end user consumption. The purpose is to show that there are several issues and challenges to explore the SCM activities carried out by manufacturing organizations in New Zealand. In developed countries like New Zealand also there is awareness of the SCM concept but the adoption of the newer concepts of SCM is not very far advanced.

Nowadays competition among companies is becoming keen and no longer between companies and companies, but supply chains to supply chains. In order to enhance their competitive edge, companies must continuously strive to seek defensive and offensive approaches so as to increase their better realization of organizational goals such as enhanced competitiveness, better customer care and increased profitability. From the 1960s to the 1990s, companies placed their emphasis /on customer loyalty. Later, the focus was shifted to

producing high quality products at reasonable costs. After words developing of variety of products to meet different needs of customer became a priority. In the 1990s, companies started discovering the impact of suppliers was of enormous significant to customers. Delivering products to customers at the right time, at the right place, and at the price has become a new challenge rather than producing only high quality products. The supply chain management approach has thus being increasingly identified by many organizations as an opportunity to achieve these goals.

Based on this evolution, both upstream firms and downstream firms have to be managed directly or indirectly by companies in order to satisfy their customers. Lee pointed out that SCM involves the flow of materials, information and finance in the network consisting of the customers, suppliers, manufacturers and distributors. Coordination and integration of these flows and their correlated activities within and across companies through improved supply chain relationships to achieve a sustainable competitive edge are critical for effective SCM. In fact, the SCM approach has been engaged by many organizations to improve their organizational performance and enhance competitiveness in the market place.

Chapter-3 Research Methodology

In order to fulfill the research objectives, an appropriate research methodology has been followed. A summary of the research methodology followed for this study has been given below:

Research Approach: Largely Quantitative Methods

Types of Research Design: Exploratory research to identify the factors and Descriptive research to know the profile of the consumers with respect to their adoption of electronic banking technology.

Sampling Design:

Universe: All the Large, Medium & Small Scale companies of India.

Sampling Frame: All the Large, Medium, and Small Scale companies of Gujarat.

Extent of Research: Engineering units of Gujarat with different scale of operation

Target Companies: Those have implemented or not implemented supply chain management irrespective of their scale of operation

Sampling Units: Representative of the company of different scales that have implemented or not implemented supply chain management.

Sampling Method/Technique: Non-probability convenience sampling method

Sample Size: Total Sample size is about 44 nos. of companies, out of which 8 nos. are large scale, 12 nos. are medium scale and 24 nos. are small scale

Types of Data: Primary as well as Secondary data

Data Collection Methods:

1) Personal interviews methods
2) Questionnaire sent by e-mail and received back (Mail Survey)

Instrument Used in Research: A structured Questionnaire was used as an instrument for data collection

Objective(s) of the study:

- To study the management's perception about reasons for implementation of SCM practices in the organization
- To study the management's perception about the issues and challenges related to the implementation of SCM practices in the organization, and
- To study the management's perception about the benefits of the implementation of SCM practices in the organization.

Significance of the Study:

- The outcome of the study is expected to help practicing managers in implementing SCM practices in organizations of different scales of operations.
- Te research shall also enhance the understanding of concept and implementation of SCM practices in the organization.

Limitation of the Study:

- Though enough care has been taken, the responses may not be fully free from the bias.
- The research findings are based on survey of select small, medium and large scale companies of Gujarat and thus have a limited generalizability.

Chapter-4 Data Analysis and Findings

This chapter is dedicated to the presentation of the research findings and analysis done through the data collection by a well designed questionnaire.

Interesting findings have emerged leading to a better understanding of the implementing and non implementing supply chain management practices in large, medium and engineering units in Gujarat such as rejection rate, market share, annual turnover, customer satisfaction,

resistance of employees, thinking about SCM, issues during implementation, use of resources, effectiveness of SCM, usefulness of SCM, etc.

Appropriate statistical tools have been used for analysis of data. Some of tools used for data analysis include Chi-square, Bar Chart and One way Annova test in addition to the basic statistical tools.

Chpater-5 Conclusion and Recommendation

This chapter provides a detailed discussion on data analysis and presents concluding remarks based on the research findings. It also provides recommendations for implementing supply chain management practice for overall growth of the large, medium and small scale engineering units of the Gujarat State.

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